FIG. 1

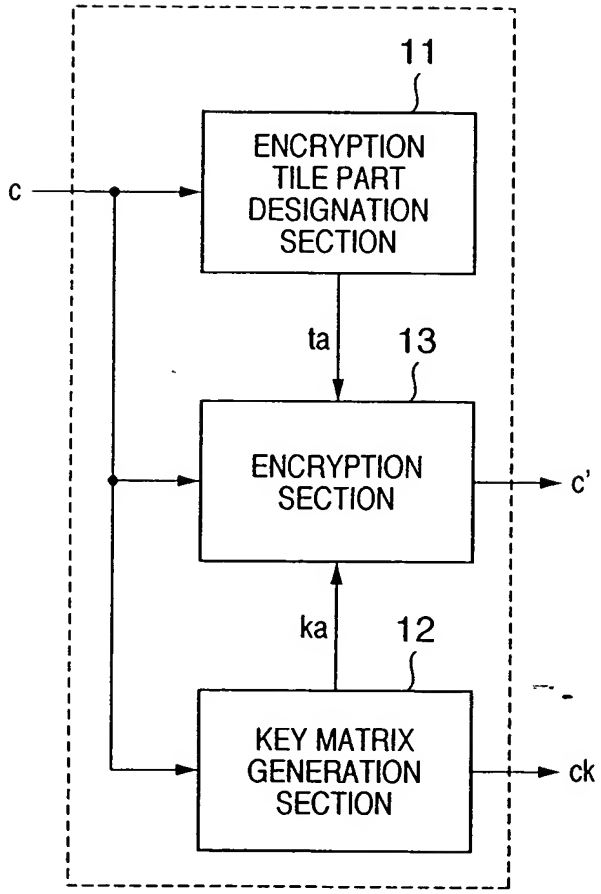

11
ENCRYPTION TILE PART DESIGNATION SECTION
c
ta
13
ENCRYPTION SECTION
c'
ka
12
KEY MATRIX GENERATION SECTION
ck

FIG. 2A

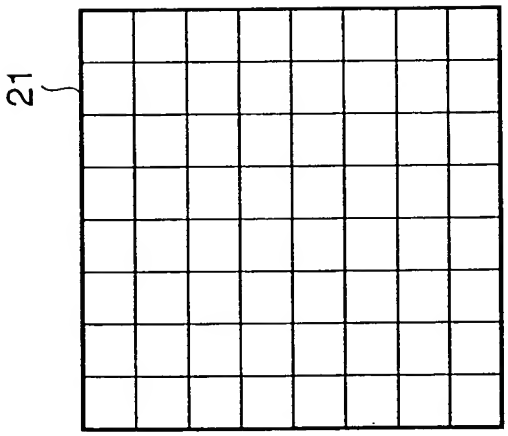


FIG. 2B

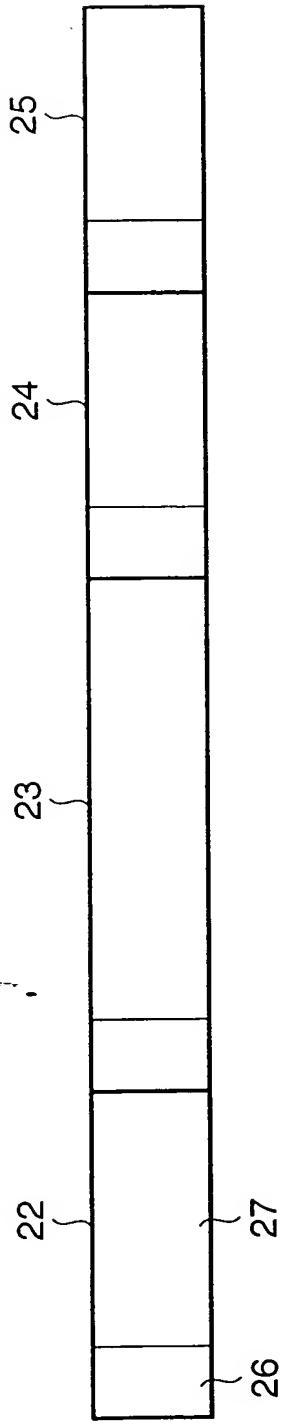
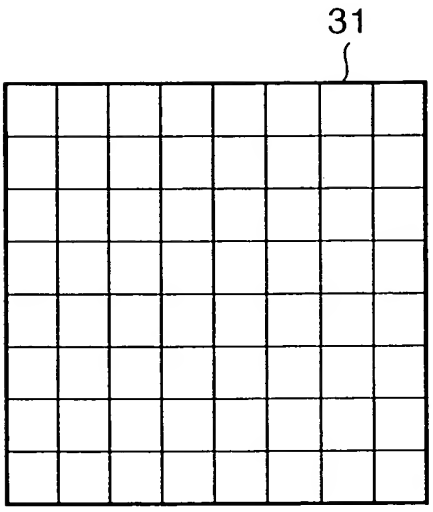
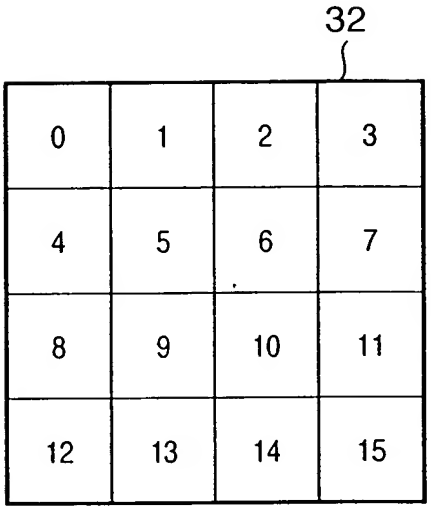


FIG. 3A



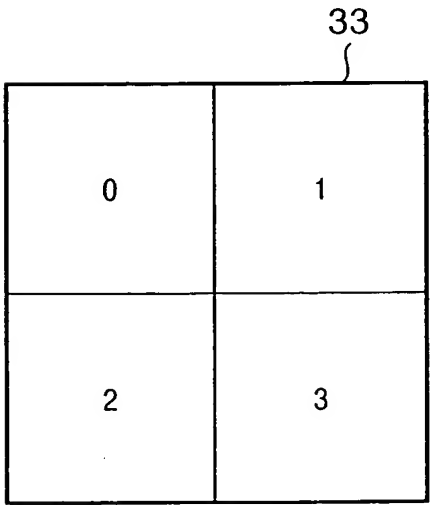
LEVEL 3

FIG. 3B



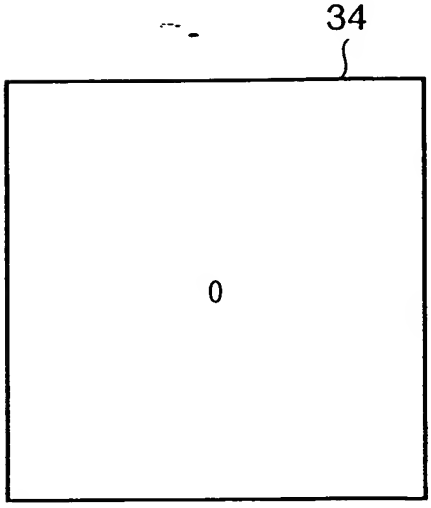
LEVEL 2

FIG. 3C



LEVEL 1

FIG. 3D



LEVEL 0

FIG. 4A

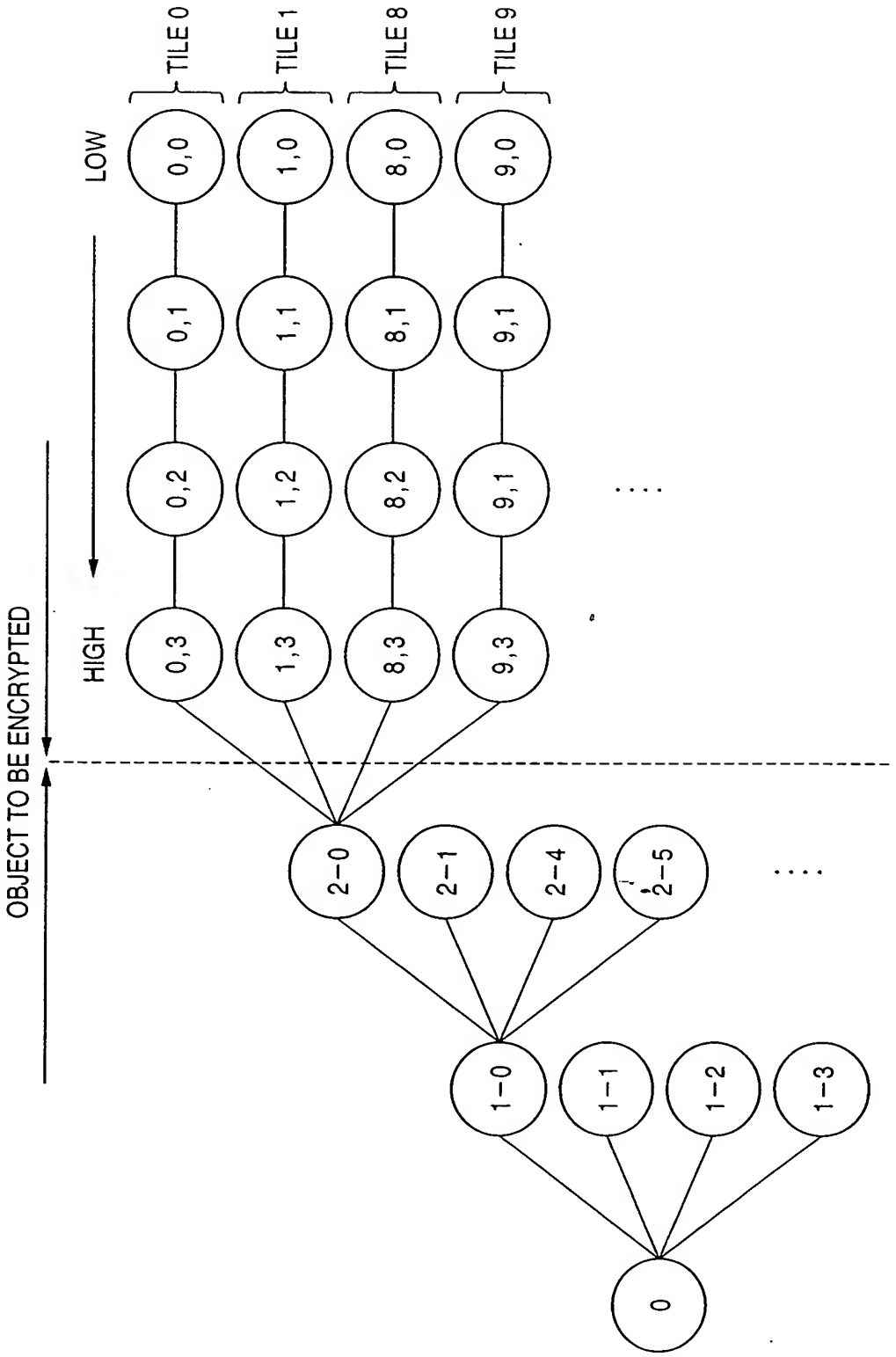

OBJECT TO BE ENCRYPTED
HIGH
LOW
TILE 0
TILE 1
TILE 8
TILE 9
0,0
0,1
0,2
0,3
1,0
1,1
1,2
1,3
8,0
8,1
8,2
8,3
9,0
9,1
9,1
9,3
2-0
2-1
2-4
2-5
1-0
1-1
1-2
1-3
0

FIG. 4B

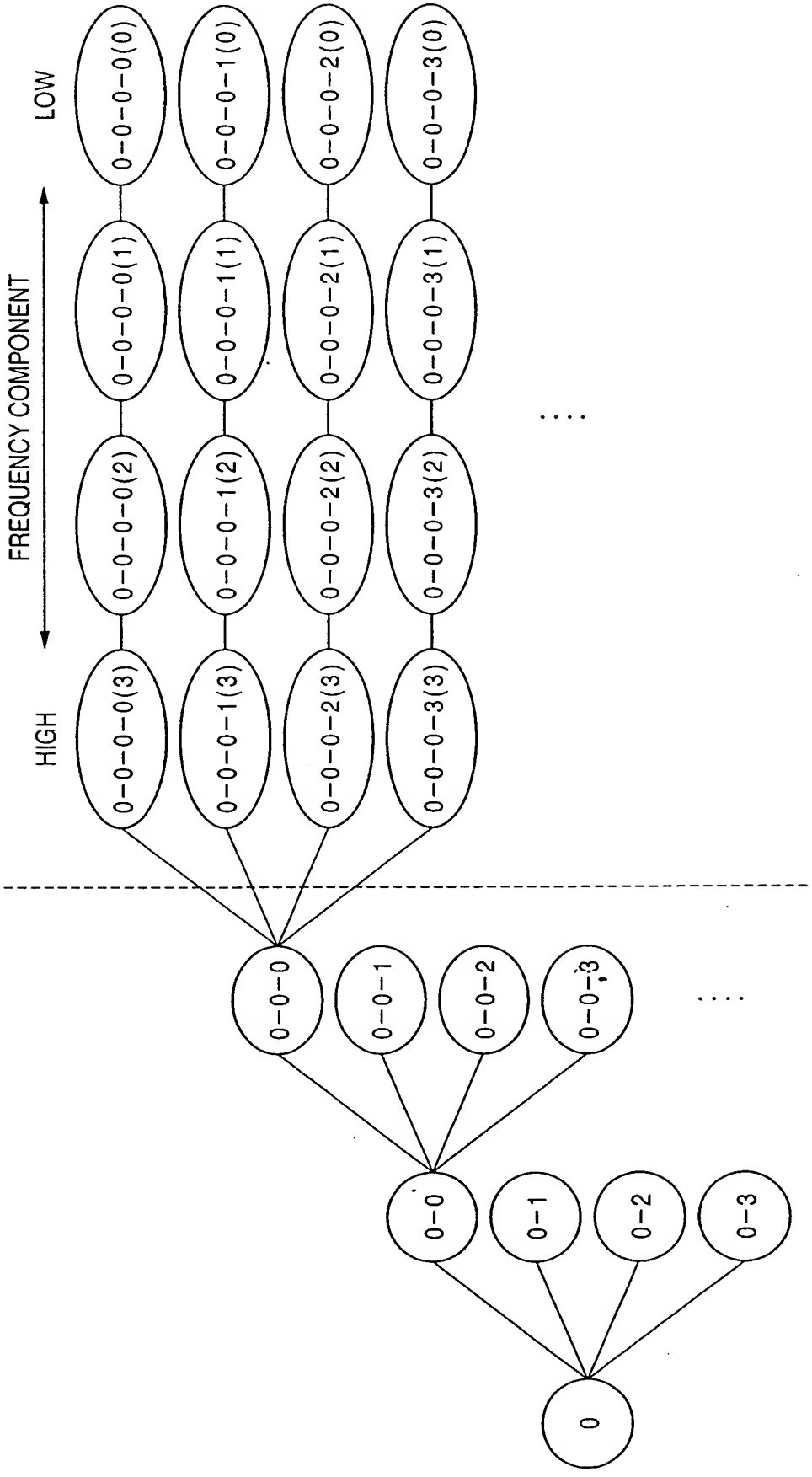

FREQUENCY COMPONENT
HIGH
LOW
0-0-0-0(3)
0-0-0-0(2)
0-0-0-0(1)
0-0-0-0(0)
0-0-0-1(3)
0-0-0-1(2)
0-0-0-1(1)
0-0-0-1(0)
0-0-0-2(3)
0-0-0-2(2)
0-0-0-2(1)
0-0-0-2(0)
0-0-0-3(3)
0-0-0-3(2)
0-0-0-3(1)
0-0-0-3(0)
0-0-0
0-0-1
0-0-2
0-0-3
0-0
0-1
0-2
0-3
0

FIG. 5

TILE INDEX	MINIMUM VALUE OF TILE PART INDEX TO BE ENCRYPTED
0	0
1	2
3	3
4	1
5	0
:	:
62	3
63	1

FIG. 6

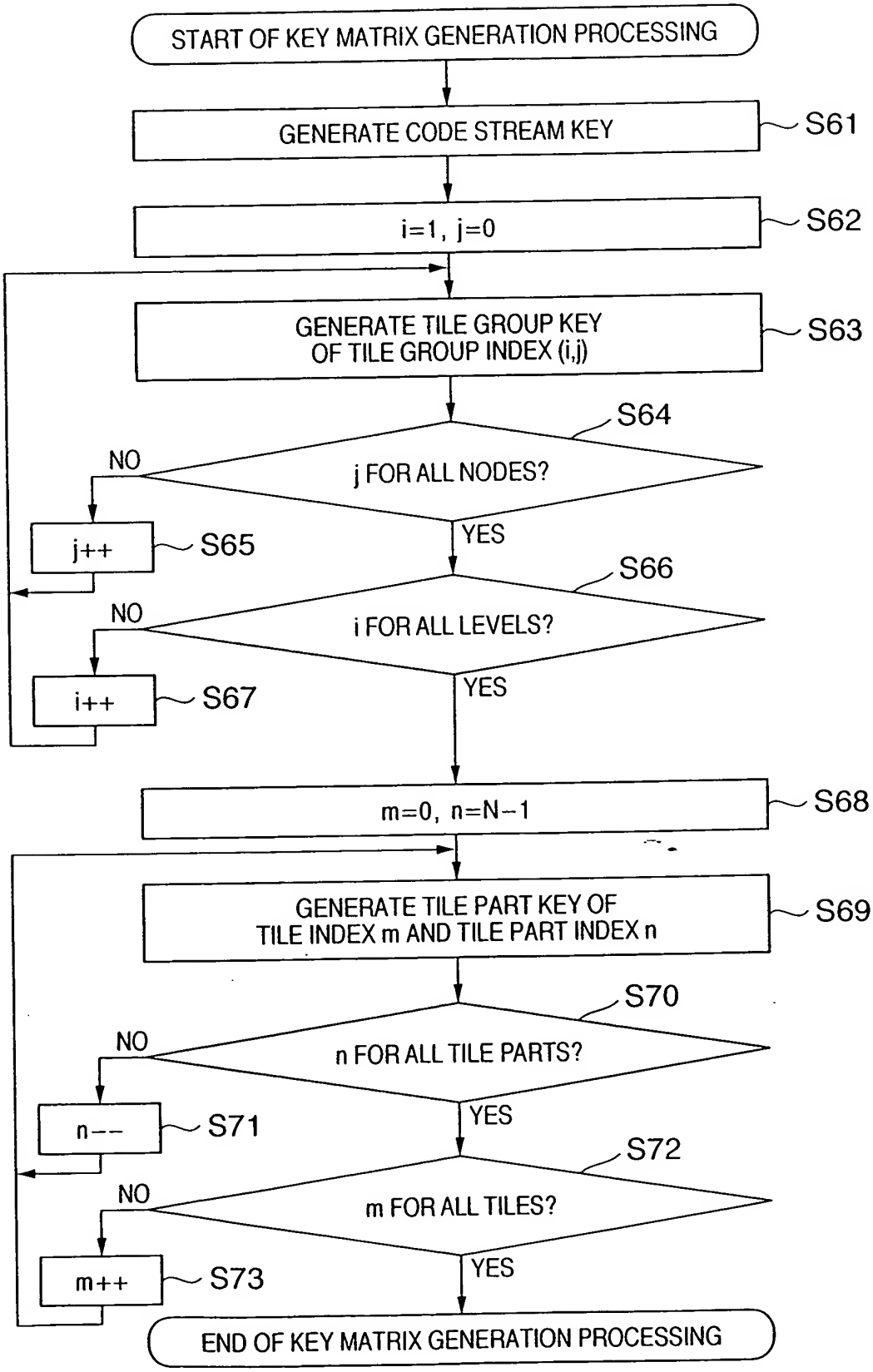

START OF KEY MATRIX GENERATION PROCESSING
GENERATE CODE STREAM KEY
S61
i=1, j=0
S62
GENERATE TILE GROUP KEY OF TILE GROUP INDEX (i,j)
S63
S64
j FOR ALL NODES?
NO
YES
j++
S65
S66
i FOR ALL LEVELS?
NO
YES
i++
S67
m=0, n=N-1
S68
GENERATE TILE PART KEY OF TILE INDEX m AND TILE PART INDEX n
S69
S70
n FOR ALL TILE PARTS?
NO
YES
n--
S71
S72
m FOR ALL TILES?
NO
YES
m++
S73
END OF KEY MATRIX GENERATION PROCESSING

FIG. 7

	0	1	2	3	4	5
0						
1						
3						
4						
5						
:						
62						
63						

FIG. 8

	0	1	2	3	4	5
0	1	1	1	1	1	1
1	0	1	1	1	2	2
3	0	0	0	1	1	2
4	0	1	1	1	1	2
5	1	1	1	1	2	2
:	:	:	:	:	:	:
62	0	0	0	1	1	2
63	0	1	1	1	2	2

FIG. 9

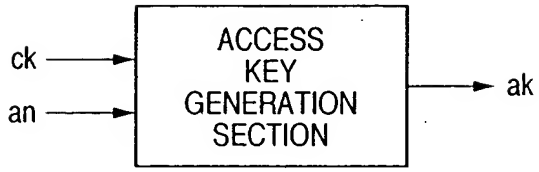


FIG. 10

ACCESS KEY VALUE
INDEX CORRESPONDING TO ACCESS KEY VALUE
INFORMATION REPRESENTING TILE PART INDEX OR TILE GROUP INDEX

FIG. 11

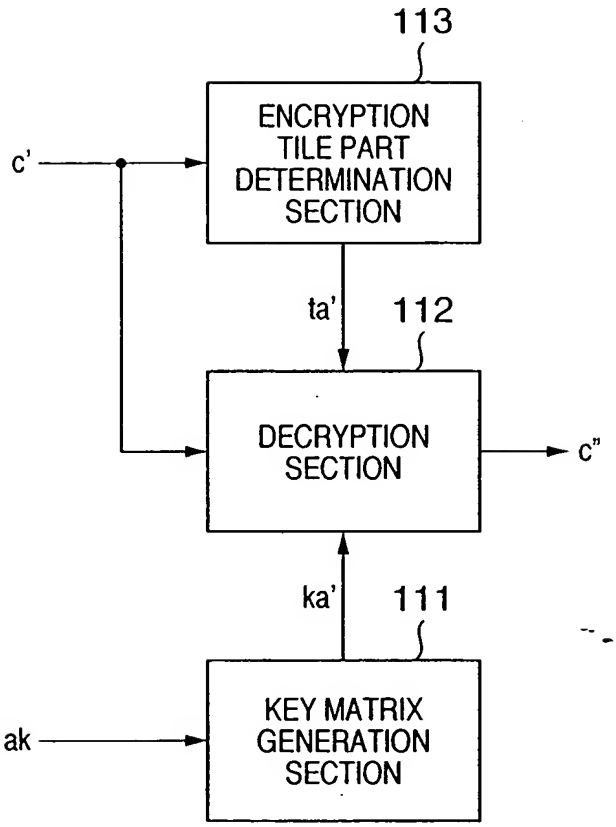

113
ENCRYPTION TILE PART DETERMINATION SECTION
c'
ta'
112
DECRYPTION SECTION
c"
ka'
111
KEY MATRIX GENERATION SECTION
ak

FIG. 12

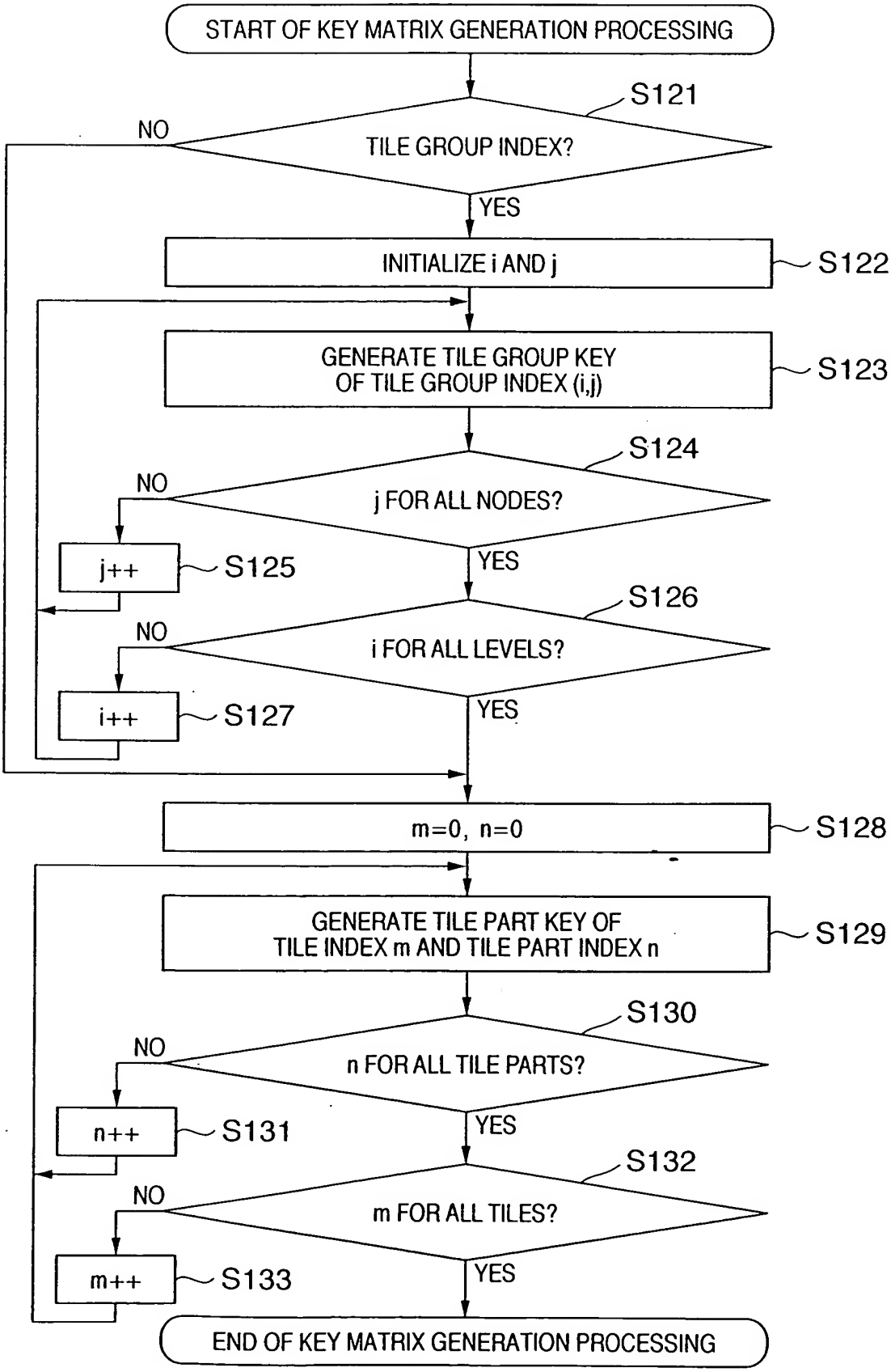

START OF KEY MATRIX GENERATION PROCESSING
S121
TILE GROUP INDEX?
NO
YES
INITIALIZE i AND j
S122
GENERATE TILE GROUP KEY OF TILE GROUP INDEX (i,j)
S123
S124
j FOR ALL NODES?
NO
YES
j++
S125
S126
i FOR ALL LEVELS?
NO
YES
i++
S127
m=0, n=0
S128
GENERATE TILE PART KEY OF TILE INDEX m AND TILE PART INDEX n
S129
S130
n FOR ALL TILE PARTS?
NO
YES
n++
S131
S132
m FOR ALL TILES?
NO
YES
m++
S133
END OF KEY MATRIX GENERATION PROCESSING

FIG. 13

	0	1	2	3	4	5
0	1	1	1	1	1	1
1	0	0	1	1	2	2
2	0	0	0	1	1	2
3	0	1	1	1	1	2
4	1	1	1	1	2	2
:	:	:	:	:	:	:
62	0	0	0	1	1	2
63	0	1	1	1	2	2

FIG. 14

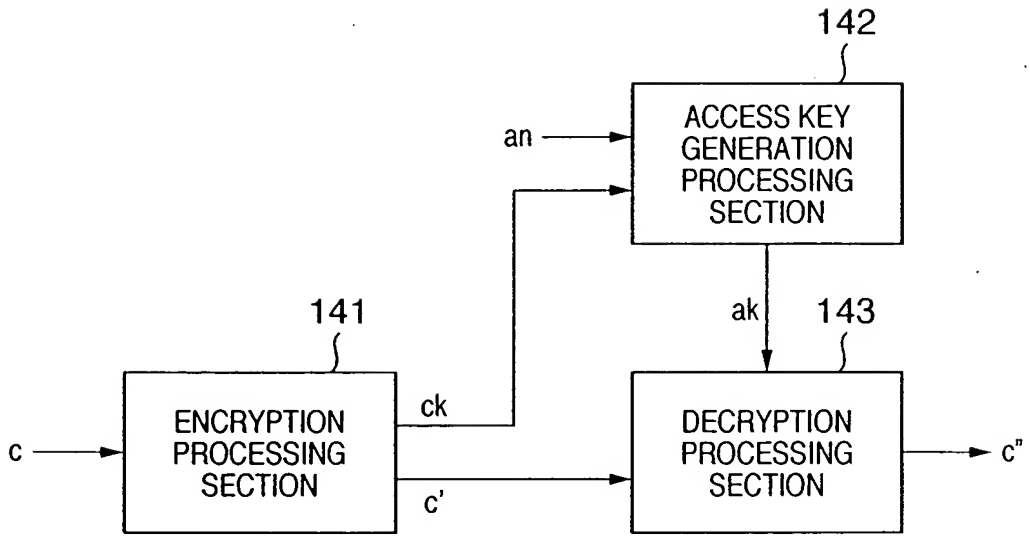

142
an
ACCESS KEY GENERATION PROCESSING SECTION
ak
143
141
ck
c
ENCRYPTION PROCESSING SECTION
c'
DECRYPTION PROCESSING SECTION
c"

FIG. 15

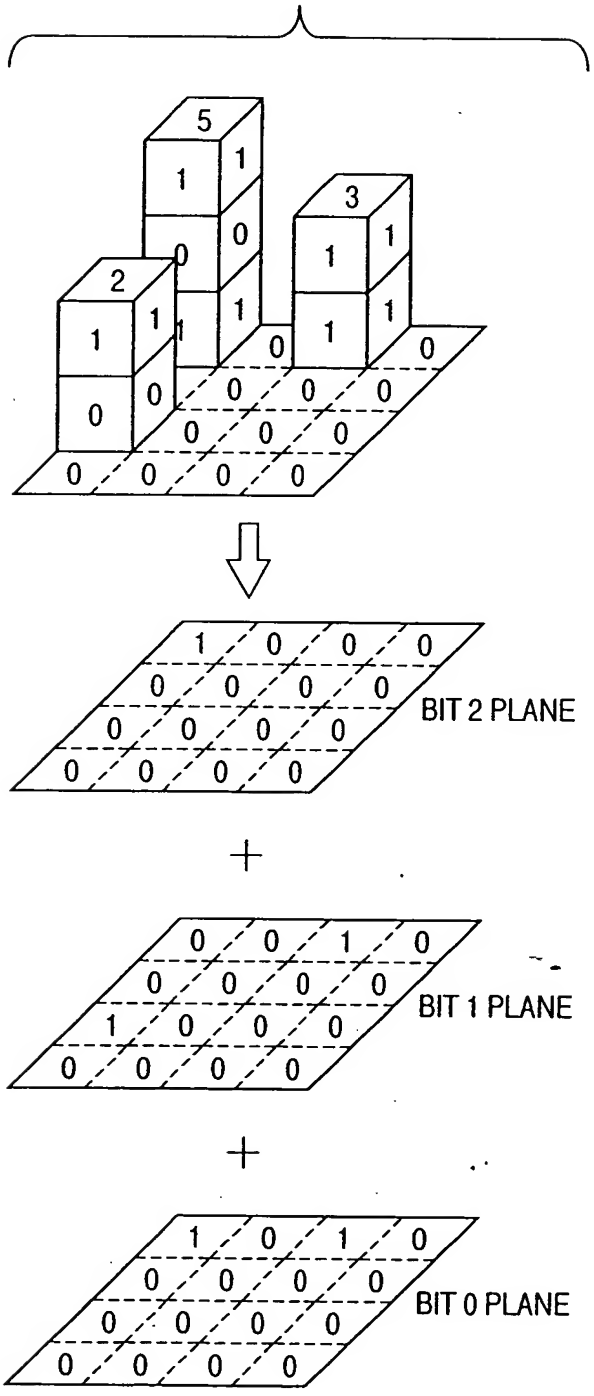


FIG. 16

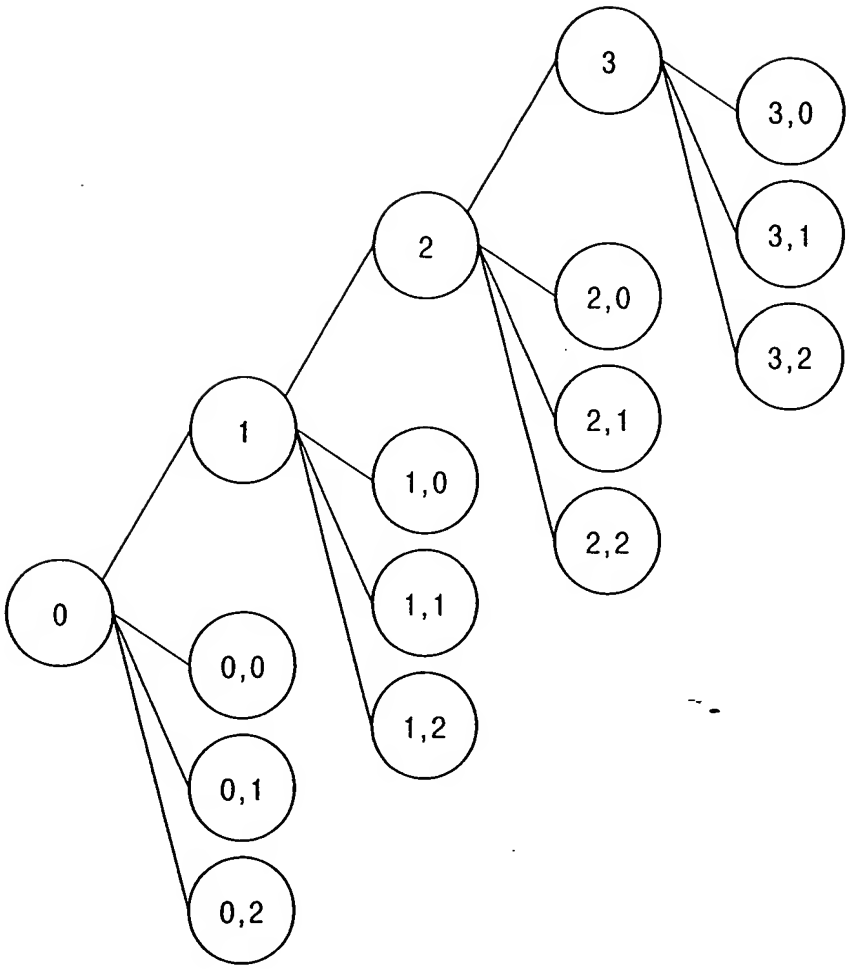
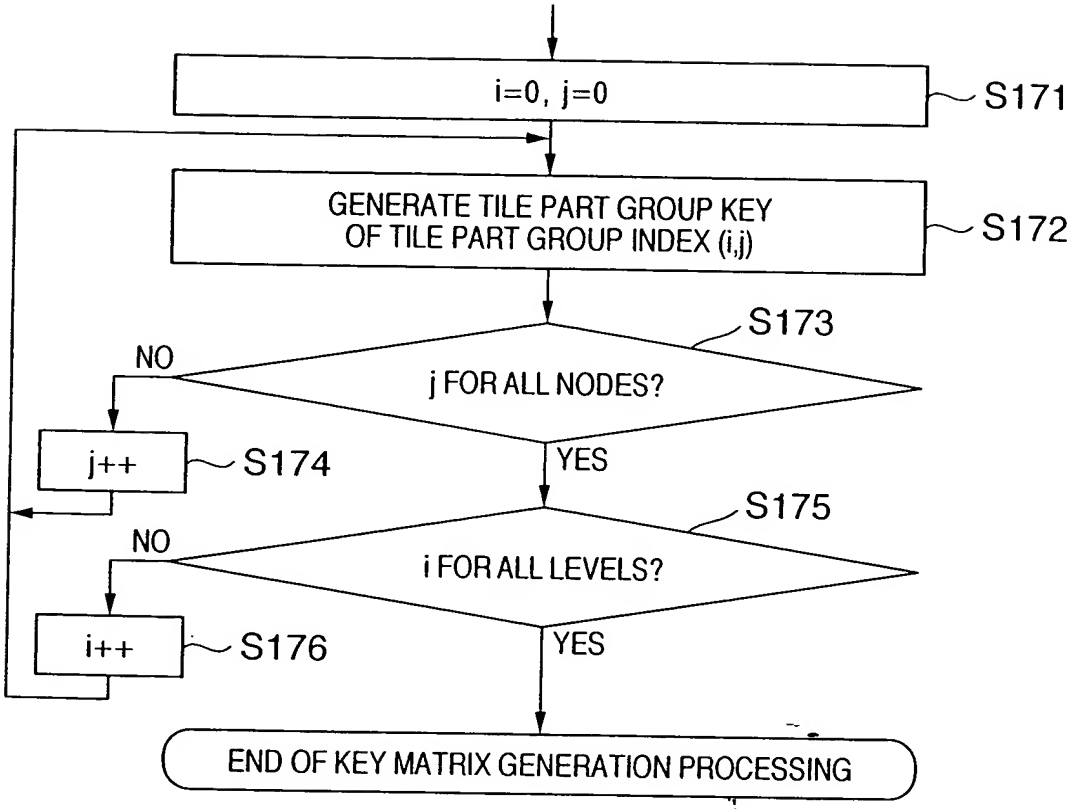


FIG. 17


i=0, j=0
S171
GENERATE TILE PART GROUP KEY OF TILE PART GROUP INDEX (i,j)
S172
S173
j FOR ALL NODES?
NO
YES
j++
S174
S175
i FOR ALL LEVELS?
NO
YES
i++
S176
END OF KEY MATRIX GENERATION PROCESSING